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Role of Report in Scientific and Technical Information Transfer

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Identifying the place of technical reports in the overall scientific and technical communication, discusses the positive roles of reports as vehicle of scientific and technical information. Also mentions the problem areas and projects the trend.

It has been established that the scientific communication, particularly communication in physical sciences, first flows through the informal channel and then, perhaps after development and modification, through the formal channel.[1] The informal communication being interactive, user directed, speedy, economical and secured, has claimed heavy reliance on it as a major source of information. But, exclusive dependence on it may lead to inadequate coverage, inaccurate results, duplication of efforts, bibliographic chaos and retardation of growth of science and technology. Thus evolved a semi-formal literature incorporating many advantages of both formal and informal communication. "A substantial and specialised segment of the semi-formal literature consists of technical reports."[2] In other words, certain informal functions of scientific and technical communication are formalised by reports to enhance the effectiveness of communication.

Periodicals and technical reports are two principal media for primary communication in science and technology. Inspite of downgrading and non-recognition by established periodicals, technical reports have gained equal or even more importance than periodicals in recent years. There was a time when publishers and editors of scientific periodicals refused to accept articles based on technical reports and did not even allow authors to cite reports. As a result, the publication of original results or ideas in technical reports was considered a professional hazard. Interestingly, "The scientist, as a producer of information is.. interested in seeing his work published in a

prestigious journal, (but) the scientist, as a user of information, is much less concerned with the way in which it is presented".[3] However, the era of periodical craziness has almost ceased for various reasons.

It is widely accepted that a precise definition of technical report cannot be given, though report can be recognised by sight. Most of the definitions of report are descriptive. Further, the boundary of reports literature is vague and it depends much on individual interpretations. There is substantial overlapping of functions of different forms of literature with technical reports.

Use of reports for internal communication and exchange of reports among scientists existed as early as in 16th century. More reports were brought out during mid 19th century as a result of large scale industrial application of science and technology. However, reports in its present and distinct form of communication is a 20th century phenomenon. Professional papers of the USGS (1902), technological papers of the NBS (1910), and reports and memoranda of Advisory Committee for Aeronautics (1909, now called ARC) and NACA (1914) are some of the earliest reports. The growth of reports was much accelerated during World War II when Government investment in science based industries increased vastly giving impetus for more research, especially defence and industry oriented research. This thrust on research coupled with the need for rapid communication immensely felt by industries, defence and other Government agencies, has brought numerous reports.[4]

"About 80-85% of the world's report literature is of US origin..and probably over 90% of reports of US and foreign origin go through the input end of..(five US agencies, namely, DDC, NASA, DOE, NTIS and ERIC) even if they do not reach the output point".[5] "By 1950 results of..(US) Government sponsored research were being published in reports at the rate of 75,000 to 1,00,000 a year".[6] There is no accurate estimate of number of reports produced at present. The estimates vary from 1,00,000 to 5,00,000 per year".[7]

Volumes have been written about technical reports and it is obvious even from a partial survey of literature that reports have created more controversies and problems than any other form of literature. What is more important is almost anything said about reports can be argued to be true. You say reports are bulky or thin, shabby or good, important or unimportant, you could still be right. In other words, reports are unusual and heterogenous in many respects. They are quasi-published, semi-formal and semi-restricted and they fall in between books and periodical articles in size, share many characteristics of preprints, reappear many a times as periodical articles, conference papers and monographs.

The rapidly growing report literature is the outcome of certain definite needs of information transfer. Reports come very handy for communication of internally generated information within an organisation and they convey information from laboratory to its headquarters organisation or contractor or any other funding agency. Enormous data and information generated in the normal course of work of R & D organisations are presented in the form of reports. Success of a library, particularly specialist library, can be partly measured by its capacity to provide internal information. Apart from avoiding duplication of work, internal reports, if handled properly, help amicable settling of agreements with outside organisations for exchange of reports.

The formal primary communication channels of information are very much choked and cannot effectively accommodate very large quantity of information, often unedited and unabridged, arising out of high rate of technological advancement and high pressure of large

scale R & D. If only adequate formal means of communication existed for scientific and technical information, reports would not have gained the importance we see today. As mentioned in the beginning, many advantages of informal communication such as rapid and effective transfer of information also contributed to the popularity of reports.

Technical reports are bestowed with many advantages. Owing to their easy, quick and flexible method of production they have enabled issuing agencies to bring out short run editions. Even bulky reports can be produced quickly and cheaply in small quantities by simple memeographing or offset printing. The microfiche has made this much more simpler. The absence of refereeing and quality control checks and unrestricted form, format and volume have further added greater speed of publication to reports. Reports stand out for their timeliness and speed and for providing most current and up-to-date information. They are normally faster than other primary media. It is said "that as vehicles for dissemination of technical information, technical reports are much faster than journal articles."[8] Sargent stressing the expensive nature of medical research, expresses the importance of technical reports in the following way. "If the technical report, by its very nature, can be issued several months to several years in advance of its appearance in a journal, then it seems to me that we are not doing a thorough job of making available all the known literature to the requester [without reports]. There can be grievous results from not having all the facts, and if all researches waited until those facts appeared in a journal or a monograph, it might well be too late to eliminate duplication of effort or to avoid a serious error".[9] He further illustrates a case where a report on 'fire and blast hazards in space cabins' was available but not made known to design engineers earlier to a particular accident that occured at Cape Kennedy.

As reports have flexibility in presentation and production, they often provide exhaustive exposition and full story of research such as experimental procedure, results of tests and observations, review of literature and progress made in field, computer programs developed, bibliographies plus a wide variety of presentations through extensive tables, illustrations and discussions to enable even an engineer, unfamiliar with the field, to get thorough knowledge of it. "Reports are, above all, purposeful publications, concerned with problems and solutions closely linked with the organisation's current or future work and aimed at particular people".[10] Reports are ideal to find out whether some one has faced similar problem in research and if so how did he solve it. Detailed description of the work carried out at each stage including failures, if any, current status of research-in-progress, recent developments in the area given in reports are essential information for engineers wishing to avoid repetition of work.

Reports are normally impersonal emphasising the corporate agency as author, though names of personal authors also appear on them. They are user directed and written for an agency which has strict control over distribution of reports and has right to acquire and use results contained in them.

Even though many librarians are inclined to accept the view that reports have limited life time, selected reports may remain useful for much longer period than others, if the contents have not reappeared in any other form. Many reports are found totally unsuitable for publishing in a formal media due to their unusual nature and length. However, it is undisputed that currency and hence utility of reports decreases rapidly when published in a formal media. There are some interesting studies made on currency of reports. A survey

conducted at TRC during June 1973 revealed that "..nearly half the requests received were for reports less than 9 months old. Less than 6% of the requests were for reports more than 18 months old".[11] Confirming the results an analysis of data of reports included in R & D Abstracts showed that "Nearly 80% of the reports were less than 9 months old and less than 5% were more than 18 months old".[12] On the other hand, it is believed that about 2/3rds of reports are distributed within two years from the date of inception of the work reported in them. In our country also the rate of obsolescence of reports could have been same as in advanced countries but for technological gap.

Further, persons in interdisciplinary and relatively new areas may prefer to communicate through reports for lack of interdisciplinary periodicals and eariler works might have already been dispersed in many periodicals. Reports cover broad range of subjects and hence facilitate interdisciplinary communications.

Unlike pure and basic research where results are often reported through periodical articles, the mission and problem oriented applied research necessarily has to first depend on reports and pre-prints for immediate communication and libraries have to handle them at least till it is confirmed that reports have reappeared in published form. Even reappeared, one report rarely leads to exactly one article and often single article draws information from number of reports.

The most important and probably the unique characteristic of reports is their alphanumeric designations called Report Series Code Numbers or simply Report Numbers. Report Code is that portion of report number which designates the issuing or controlling agency. The accession or handling number and contract or grant or project number are often deemed to be report numbers for the purpose of identifying and handling reports but they are handicaps in many respects. Even report numbers themselves pose many problems for lack of consistency in creation and use. However, owing to their simplicity, brevity and mnemonic value, report numbers have gained popularity as security codes, filing designators and bibliographic references. Physical and bibliographic identification, access, control and organisation are very much aided by these 'pseudo call numbers' of reports. Report number is not only an example of a suitable substitute for source classification but also remains as a challenge to classification in its popularity. It also serves as an example where universally accepted practice of subject arrangement and browsing of documents are sacrificed for ease of handling as report numbers rarely represent subjects. Thus, even today most of the technical reports in many libraries escape rigorous ritual called classification.

Many reports are produced as per standard and contain a full page 'document control data sheet', perforated ready to use source index cards with full bibliographic details, abstract and sometimes even UDC class numbers.

The security-classification is the biggest stumbling block in scientific and technical information transfer through reports. In addition to language and political barriers security -classification impedes flow of scientific information leading to underutilisation of scientific and technical capabilities, duplication of efforts, reluctance of young scientists to work in such areas and increased activity of invisible colleges. The overzealous application of national security on this so called shadow literature is resulting in confrontation between scientists and government agencies.

In nutshell, technical reports are user directed yet much more than personal contacts which are limited and often oral, faster and more accommodative than periodicals and more practical and purposeful than conference papers. It is claimed that "..some important

research and development remains only in report form".[13] Considering the positive roles of technical reports Hall rightly says ". . .more than any other form of library material, technical reports need to be brought vigorously to the attention of those to whom they may be useful".[14]

Reports having created a new channel of scientific and technical communication pose many problems. This shadow literature has partially created bibliographic chaos instead of bibliographic control. It appears that unclassified reports are subjected to excess bibliographic control leading to overlapping coverage by many secondary periodicals, multiplicity of report numbers and accession numbers and duplication of efforts. On the other hand, classified reports are subjected to negative bibliographic control.

The bibliographic control and distribution of unclassified technical reports have been so much commercialised by some agencies that it became very costly to avail services of such agencies. Even Librarians may have to spare substantial time and efforts to study and understand wantonly made complexities, content duplication and discriminated pricing policies of these agencies. This dependence on agencies of information rich countries is steadily increasing. India too is potentially rich, but for lack of national agency to organise and explore this resource, the position of India in this respect is very similar to that of exporting iron ore and importing steel. At present many of our R & D reports can be more easily located and purchased from agencies of information rich countries than within the country. The situation is well exploited and encashed by foreign agencies and their Indian agents.

Many problems related to proliferating report numbers, microforms, organisation of internal reports, barriers of security-classification, lack of quality control, bibliographic control, content publication and noise, procurement and organisation of reports are not dealt here, as the emphasis is only on positive roles of reports. Though initially editors of scientific periodicals have discouraged reports and documentalists have not given due status to reports, report handling agencies have brought archival status to reports. "Notwithstanding the controversy over their status, technical reports are becoming increasingly important as vehicles for the dissemination of technical information".[15]

Reports are the major let-outs of R & D engineers and technologists who depend heavily on intra-corporate sources of information with less autonomy in choice of projects as against academicians and scientists who not only have wider choice of topics but also communications, both inside and outside the undertaking, and should be given preferential treatment in special libraries".[16] Looking at the trend that private communications, which are supposed to mask reports, are declining, increasing coverage of reports by secondary periodicals and use of reports in social sciences it is strongly urged that "the technical reports should now be accorded full recognition as an established form of technical literature and should be granted the rights therefrom by those handling that literature".[17]

REFERENCES

1. GARVEY (WD). *et al.*, "Communication in the Physical and Social Sciences", *Science*, 170 (3963) 1970, 1170.

2. National Academy of Science and National Academy of Engineering. Committee on Scientific and Technical Communication, *Scientific and Technical communication: a pressing national problem and recommendations for its solution.* Washington D.C.: National Academy of Sciences, 1969, p 115.

3. BREARLEY (Neil), "The role of technical report in scientific and technical communication", *IEEE Transactions on Professional Communication*, pc-16 (3) Sept. 1973, 117.

4. KENT Allen and LANCOUR (Harold) *ed. Encyclopedia of library and information science*, Vol 30. New York : Marcel Dekker, 1980, p 147 and J.C. Hartas, "Technical report literature : its nature and some problems" *In* : Bernard Houghton *ed. Information work today.* London : Clive Bingley. 1967, p 80-81.

5. CHILLAG (JP). "Don't be afraid of reports", *BLL Review*, 1(2) Oct. '73, p 39-40 and J. P. Chillag, "Problems with reports, particularly microfiche reports", *Aslib Proceedings*, 22 (5) May, 1970, 201-202.

6. GODFREY (LE) and REDMAN (HF) *ed. Dictionary of report series codes* 2 ed. New York ; SLA, 1973, p 2.

7. See KENT (Allen) and LANCOUR (Harold) *ed. Idem*, Vol 30, p 141-147 for different estimations.

8. KENT (Allen) and LANCOUR (Harold) *ed., Idem.* Vol 30, p146.

9, SARGENT (Charles, W) "Handling technical reports in the medical library," *Bulletin of Medical Library Association*, 57 (1) Jan. '69, p 43.

10. HARTAS (J C) *Idem.* p 80.

11. BENNING (V J) "Reports" In : K. W. Mildren *ed. Use of engineering literature.* London : Butterworths, 1976, p63.

12. *Ibid*, p 67.

13. BENNING (V J) *Idem*, p 62.

14. HALL (J L) "Technical report literature", In ; W. E. Batten *ed. Hand-book of special librarianship and information work.* 4 ed. London, Aslib, 1975, p 118.

15. KENT (Allen) and LARCOUR (Harold) ed., *Idem*, vol. 30, p 156.

16. HARTAS (J C) *Idem*, p 86.

17. GODFREY (L E) and REDMAN (H F) *ed., Idem*, pl.

List of Acronyms and Abbreviations used

ARC : Aeronautical Research Council (UK)
DDC : Defence Documentation Centre (US Dept, of Defence)
DOE : Department of Energy (USA)
ERIC : Educational Resources Information Centre (USA)
ISI : Indian Standards Institution
NACA : National Advisory Committee for Aeronautics (USA)
NASA : National Aeronautics and Space Adminis-tion
NBS : National Bureau of Standards (USA)
NTIS : National Technical Information Services (USA)
TRC : Technology Reports Centre (UK)
USAEC : United States Atomic Energy Commission
USGS : United States Geological Survey

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